

Abstract

A asynchronous transfer mode switch comprising at least one switching engine, where a switching engine comprises a set of buffer groups, where each buffer group comprises a set of 1-cell buffers, and where a cell is stored in only one buffer. The number of buffer groups exceed the number of input ports to the switching engine, so that head-of-the-line blocking is reduced. Cells are switched to a buffer group by a crossbar switch, and are switched to a particular buffer within a buffer group by a demultiplexer. The switching engine also comprises a buffer management module to allocate buffers that are available to store cells. The buffer management module comprises a FIFO memory to maintain a pool of buffer groups that have at least one available buffer. The buffer management module also comprises memory to store bit maps for each buffer group and to store a CNT field value for each buffer. A bit map for a buffer group indicates which of its buffers are available to store a new cell, and which buffers still contain a cell that have not yet been read by its destination ports. A CNT field value for a buffer indicates the number of destination ports that have yet to read the cell stored in the buffer. A crossbar switch allows the output ports to read the buffers. In this way, a multicast cell need only be stored in one buffer, but all output ports may read the buffer storing the multicast cell. The bit maps and CNT field values are updated during buffer allocation and buffer reads, so that the FIFO maintains a current list of all buffer groups having available buffers.